

## REMARKS

Claims 1-20 and 22-27 are pending. Of these claims, new claims 24-27 have been added.

Claim 24 recites the lenticular element is made directly on the opposite face of the substrate, support for which is found in the specification at least at page 7, lines 2-5.

Claim 25 recites the micro-lenses are embossed directly in the opposite face of the substrate, support for which is found in the specification at least at page 12, lines 18-20.

Claim 26 is an independent claim finding support from claim 1 and reciting a first lenticular optical element comprises a plurality of micro-lenses formed on the outer face of the transparent substrate and cooperating with the multi-point light source. Support for this is also found in the specification at least at page 11, and lines 24-26.

Claim 27 recites a first lenticular element is made on the outer face of the substrate and a second element on the inner face of the substrate, support for which is found in the specification at page 7, lines 10-13.

It is respectfully submitted present claims 1-23 distinguish over the combination of Madigan and Brass for at least the reasons presented in the Request for Reconsideration filed December 18, 2006.

Moreover, new claims 24-27 further distinguish over the combination of Madigan and Brass. Claims 24 and 25 recite elements or micro-lenses, respectively, directly on the substrate. Claim 26 further recites "a first lenticular optical element comprising a plurality of micro-lenses formed on the outer face of said transparent substrate cooperating with the multi-point light source." Claim 27 recites a second lenticular optical element on the inner face of the substrate. Such features are not disclosed or suggested in the combination.

## Rejections

Herein below Applicants recite the grounds of rejection alleged in the Final Office Action and the responding arguments from the previously-filed request for reconsideration on December 18, 2006.

I. (A) Claims 1-5, 8, 10-17 and 19-20 under 35 U.S.C. §103(a) in view of the article by C.F. Madigan (Improvement of output coupling efficiency of organic light-emitting diodes by backside substrate modification, XP-0009505101, *Applied Physics Letters*, Volume 76, Number 13, 27 March 2000, hereafter "Madigan") disclosed by the Applicant, and Brass et al. (U.S. 6,979,104, herein after "Brass").

It is alleged in the Office Action that Madigan substantially discloses the claimed invention including an OLED, but it is also admitted that Madigan fails to disclose a light source with its optical axis laterally shifted from the central axis of a lens, or lenses of different geometric configurations. However, it is alleged that Brass teaches a light source with its optical axis laterally shifted for the purpose of yielding a beam with increased focus, and that it would have been obvious to a person of ordinary skill in the art to manipulate the lens in Madigan to achieve a desired effect.

(B) Traversal

(i) Micro-lenses embedded on a substrate as in the present invention are not movable or displaceable

Applicant respectfully submits that the combination of Madigan and Brass fails as a combination to disclose or suggest all of the recited elements in the rejected claims in part because Brass, which is directed to an inspection lamp, discloses at column 5, lines 3 to 15, that:

a lens may be movable to permit adjust of beam characteristics. The focal height of the lenses ... may be adjustable so as to permit changing the

distance at which beam size and intensity formed by each light emitting diode and each associated lens are best-formed. The distance between lens centers may be smaller than the distance between the centers of their associated light emitting diodes so that the beam components formed by each lens from its associated light emitting diode converges towards each other.

Thus, Brass discloses adjusting the beam by moving the lens, and Madigan is admittedly silent in this regard.

In other words, the patent to Brass discloses an embodiment wherein the luminous beams emitted by the plurality of light sources of the inspection lamp are all directed towards a target area or point in order to obtain a single spot in a pre-defined plane (see last three lines of col. 4 and first line of col. 5- see also col. 7, lines 2-5).

The possibility of adjusting the relative position between the LED's and the axis of the lens is always referred to the object to make the resulting beams converge onto each other at a predefined point (see also col. 12, lines 36-45). See also col. 12, lines 62-65, wherein it is clear that the LED's are offset from the axes of their associated lenses in order to obtain beams that coincide at a specific distance forward of the lenses.

With respect to Brass, Applicants also respectfully submit that claim 24 of Brass recites an inspection lamp having "*two or more light emitting diodes*" ... *wherein the individual beams converge towards each other such that the axes of the beam intersect with each other at a specific distance forward of the lenses..*".

Furthermore, Brass discloses in the Abstract of the disclosure a feature that the resulting beam is focused in a target area at a target distance from the lens is repeated and outlined.

In contrast to the combination of Madigan and Brass, the present invention recites the use of micro-lenses (having a size on the order of a micron) directly molded on a substrate.

Therefore, there is no possibility either to make a lens movable or to displace a lens with respect to the relative LED, in order to have a shift between the LED and the optical axis of the lens, because the lens are molded into the substrate.

(ii) Madigan and Brass involve very different technological fields which would not be obvious to combine

In addition, the patent to Brass discloses an inspection lamp having a very low number of LED's, in the range of units or a tenth at a maximum (see all the enclosed figures), whereas the present patent application refers to the technology of micro-lenses associated with thousands or more of organic leds (OLEDs), each having a size on the order of microns.

It would be clear to a person of ordinary skill in the art that the present invention refers to a field of the production of light sources using OLED technology (see also the article to Madigan, which is in the same field as the claimed invention). In contrast, Brass, which refers to the field of inspection lamps, is in a different field than the present invention and cannot be compared to the present invention.

Thus, Applicant respectfully submits that the teachings of Brass and Madigan are not combinable, as they refer to completely different fields and one cannot be said to be analogous art of the other that is used to solve a similar problem.

(iii) Sizes applied to the distances between the lens and the optical sources are very different in the present invention as compared with Brass

Moreover, as explained in more detail hereinafter, in the present invention the sizes applied to the distances between the lens and the optical sources are on the order of microns (see, for example, page 12, lines 6-8). In contrast, in the patent to Brass the sizes are on the order of

tenths of millimeters (e.g. col. 12, lines 40-42), whereas the interaxes between the lenses are on the order of hundreds of millimeters.

Also, in the present invention the shifting between the micro-lens and the point of light emission is directed to the object "in a desired manner by means of the specific design of the lenticular element 21" (page 12, lines 10-12, and see at least claim 5).

More particularly, as explicitly disclosed in the article entitled "Efficient Light Extraction and Beam Shaping From Flexible, Optically Integrated organic Light-Emitting Diodes" by *P. Melpignano et al.*, submitted in the response to the previous Office Action and resubmitted as Attachment I in the Request for Reconsideration, it is shown that the last six lines of right column of page 1 and the first three lines of the left column of page 2, read as follows:

The far-field light distribution ... is obtained by the sum of overlapping images of the OLED pixels, which is called a patch pad design. The basic unit of 5 x 5 micro-lenses forms the desired light distribution in the far field. This approach has two advantages; the emitted light is concentrated and shaped in a specific solid angle, and the light extraction from the OLED multilayer structure is improved by direct optical coupling.

Still referring to the above-mentioned article by *P. Melpignano et al.*, there is shown a Fig. 1 having comments stating, *inter alia*, "The box highlights the engineered 5 x 5 optical unit producing the Gaussian light distribution" which is an example of the "desired manner" in which the light is distributed by using a specific design pertaining to each lens and an individual shifting between the axis of each lens and the relative light source.

This functional feature is reflected by the completely different amount of the shifting, which as said above, is always maintained to be on the order of some millimeters in the patent to Brass, whereas it is "some microns, or some tenths of microns: (page 12, lines 7-8 of the specification), a maximum amount of 15 micrometers (sixth line from the end of right column 1, page 1 of the above-cited article) in the specification of the present invention.

(iv) Madigan fails to disclose an individual lateral shift, and combined with Brass a person of ordinary skill in the art would not have found suggestion or motivation for an individual lateral shift of the relative center with respect to the relative point of light emission as in the present invention

As previously discussed, Madigan, similar to the present invention, refers to the production of arrays of micro-lenses having a size on the order of microns. The micro-lenses, which are directly molded on a flexible substrate in a number on the order of thousands, are coupled with organic LED's (OLEDs) using very sophisticated techniques, in order to position with extreme accuracy the center of the lens, which is shifted for a desired value with respect to the crossing points between anode and cathode of the light source (see for example, page 7, lines 19-25).

The overall and individual shifting between the lenses and the light sources is directed to obtain a partial overlapping of the individual beams in order to create a desired pattern of light distribution in a defined plane.

The patent to Brass is directed to lamps having lens and LED's, wherein the shifting between the lens and LED's is directed to focalize the beams so that all the beams converge to a target point at a target distance from the lens.

A person of ordinary skill in the art reading Brass, which refers to an inspection lamp having some single LED's whose beams are focused towards a target, would not have found it obvious to modify the teaching of Madigan, which does not mention the recitation in the claimed invention that an individual lateral shift of the optical axis is some tenths of a micron between each micro-lens and the relative light source, in order to obtain a desired distribution of the intensity of the light, for example, a Gaussian distribution.

We note that Madigan already discloses an offset between the center of curvature, i.e., the center of the sphere from which the spherical lens is generated, and the point of light emission (the OLED), and this offset is taken in a direction which is orthogonal to the plane where the lenticular element having the micro-lenses lies.

In other words, Madigan already uses a technique, which is different from that disclosed in the present patent application, and which teaches how to modulate the intensity of the far-field pattern of the light distribution.

There is no hint, therefore, for Madigan to use the teaching of the patent to Brass, which refers to a completely different kind of product and technology, in order to solve a problem that in the patent to Brass is different, i.e. to obtain all the beams towards a target point.

Reconsideration and withdrawal of this ground of rejection are respectfully requested.

II. (A) Rejection of Claims 6, 7, 22 and 23 under 35 U.S.C. §103(a)

It is alleged in the Office Action that claims 6, 7, 22 and 23 would have been obvious to a person of ordinary skill in the art in view of Madigan because although Madigan admittedly fails to disclose micro-lenses or a substrate sized as claimed, Madigan does disclose the claimed micro-lenses being embedded on a substrate and allegedly it would have been obvious to a person of ordinary skill in the art to decrease the size to lower material costs and material processing time thus increasing efficiency, as such a modification would be a "mere change in the size of the existing components."

(B) Traversal

Applicants respectfully submit that none of claims 6, 7, 22 and 23 would have been obvious to a person of ordinary skill at the time of invention in view of Madigan. Referring to present claim 6, which recites a micro-lens having a thickness of between 1 micron and 100

microns, claim 7, which recites a lateral size of the micro-lens between 5 microns and 1000 microns, and claims 22 and 23, which respectively recite a thickness of between 1 micron and 40 microns, and a lateral size between 10 microns and 300 microns, these values are significantly lower than shown in Table I of Madigan, which lists measurements (of the lens used during a series of listed trials. While it is true that Madigan discloses at page 1652, second column, that a "few" mms constitutes a lens size, and further says the size could bottom at 100 microns, this amount is significantly greater than a 1 micron, 5 micron, 1 micron or 10 bottom, respectively recited in claims 6, 7, 22 and 23. This size difference is not a mere change in the size of the existing components. Reducing the micro-lens to such a size requires a significantly smaller OLED diameter, and a smaller lens diameter (Madigan, page 1652, 2nd paragraph), and thinner substrates.

Thus, unlike the discussion in MPEP 2144.04 IV A, the claims are not a "mere scaling up [down] of a prior art process... ." Madigan fails to disclose lateral shifting of the optical axis as claimed and Brass discloses a shift of the access by moving or displacing the lens, whereas the present invention does not move the lens to laterally shift the axis. Accordingly, the sizes and thicknesses of the micro-lenses, as recited in claims 6, 7, 22 and 23 are not a mere scaling of anything disclosed by the combination of Madigan and Brass.

Accordingly, a person of ordinary skill in the art would not find the reduction of size of the level recited in claims 6, 7, 22 and 23 that it would have been an obvious change. In addition, claims 6, 7, 22 and 23 are also patentable based on their dependency from claim 1, which is believed to be allowable.

Applicants also ask reconsideration of the statement in the Office Action that the method steps are not given patentable weight, regarding claims 12-20. Applicants are not claiming



product by process claims, wherein the structural limitations of the product are used to determine patentability. Applicant's has recited a series of method steps to create a heretofore unknown lighting device. The series of method steps are new, and non-obvious compared to the method to build other types of lighting devices, and are thus patentable.

III. Conclusion:

In view of the above, it is respectfully submitted that all rejections are overcome. Thus, a Notice of Allowance is respectfully requested.

Please charge any fee deficiency or credit any overpayment associated with this Amendment to Deposit Account No. 19-4375.

Respectfully submitted,

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